REMARKS

Status of the Application

The pending claims are 12-22. The pending claims stand rejected under 35 U.S.C. § 103.

Claim Rejections - 35 U.S.C. § 103

1. WO 01/41512 and Polymer Preprints 41(1), 2000, pp. 770-771

Claims 13-15 and 17-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over WO 01/41512 ("*Thompson*") in view of the article by Djurovich et al., Polymer Preprints 41(1), 2000, pp. 770-771 ("*Djurovich*"). Applicants respectfully maintain their traverse this rejection

Claims 13-15 and 17 (compound claims) and 18-21 (device claims)

Applicants' claims 13-15 are compound claims and conform to the general formula L_3M where each L is the same bidentate ligand. In each of these claims, the phenyl (or aryl) ring is substituted with two fluorine atoms (claims 14 and 15) or three fluorine atoms (claim 13). *Thompson* identifies suitable L and X ligands for L_2MX compounds in Fig. 39 (see page 16, line 25, page 17, lines 26-30, and Fig. 39). Examples of LL'L"M compounds where each ligand is different are shown in Fig. 40 (please see page 12, lines 8-10 and Fig. 40). In summary, Applicants' compound claims address L_3M complexes and the portions of *Thompson* most closely associated with Applicants' ligands address L_2MX complexes. Accordingly, *Thompson* teaches that arylisoquinoline is useful in an L_2MX complex and discloses different species for the LL'L"M complexes (Fig. 40). *Thompson* therefore teaches away from using phenylisoquinoline in an L_3M complex or using phenylisoquinoline and phenylquinoline in an $IrL^aL^bL^c$ complex. There is nothing in *Thompson* to motivate one skilled in the art to make L_3M emissive complexes with phenylisoquinoline or $IrL^aL^bL^c$ emissive complexes with phenylisoquinoline, phenylquinoline, or combinations of one or more of the two.

Device claims 18-20 comprise a layer that comprises at least one compound of claims 12-17. Claim 21 is drawn to an organic electronic device comprising an emitting layer comprising at least one compound having the formula $IrL^aL^bL^c$ wherein each of L^a, L^b and L^c are alike or different and have structure XI or XII. Structure XI is a phenylquinoline and Structure XII is a phenylisoquinoline. *Thompson* discloses organometallic compounds of formula L_2MX where L and X are distinct bidentate ligands (page 1, lines 8-9). *Thompson* also discloses organometallic compounds of formula LL'L"M wherein each of L, L' and L" are distinct bidentate ligands (page 3, lines 26-27) or are the same or different (page 3, line 35). As noted above,

Thompson's Fig. 39 discloses an arylisoquinoline labeled as "arylquinolines" but does not disclose an arylquinoline. From this it can readily be seen that claims 13-15 and 18-20, being directed to L_3M compounds, are distinct from L_2MX and LL'L"M where each of L, L' and L" is a distinct bidentate ligand. Formula XI is also distinct from anything disclosed in *Thompson*. Applicants respectfully reiterate that Fig. 39 in *Thompson* is the only depiction in the entire disclosure of the basic structure labeled "arylquinoline" and is shown with one substituent, R', R" and R'", respectively, on each ring of the system. These substituent groups are nowhere defined. R groups are conventionally understood to represent alkyl groups, and may include phenyl or aryl groups if so defined. X conventionally represents halogen. The only depiction of arylquinolines in *Thompson* therefore teaches that all three rings are substituted once each with alkyl or possibly phenyl or aryl groups.

Djurovich is directed exclusively to phenylpyridines (ppy) and enhanced solubility of fluorinated ppy. None of Applicants' ligands comprise ppy. Even if *Djurovich* teaches the use of fluorine substituents to enhance solubility, which Applicants do not necessarily concede, the combination of *Djurovich* and *Thompson* still does not lead to Applicants' claimed ligands. To achieve Applicants ligands one skilled in the art would have to overcome *Thompson's* teaching *contra* phenyisoquinoline as L in L_3M and $L^aL^bL^c$ in the other complex as one or more phenylisoquinoline, one or more phenylquinoline, or combinations of one or more phenylisoquinoline and one or more phenylquinoline. Therefore, it would not have been obvious to one skilled in the art to combine *Djurovich* with *Thompson* to arrive at the Applicants' ligands or the general formula L_3M, Structures XI and XII, or the specific compounds disclosed in claims12-17.

Claim 21 is directed to a device in which three ligands, which may be alike or different, selected from Structures XI and XII, are bound to a metal. As noted previously, Structure XI is phenylquinoline, while Structure XII is phenylisoquinoline. The substituents are, generally, fluorine, fluoroalkyl, fluoroalkoxy, and difluoromethoxy or diflurohalomethoxy. As noted above, *Thompson* does not disclose a phenylquinoline such as XI and the arylquinoline of Fig. 39 is limited to one substituent group per ring, where there is no teaching or suggestion that the substituents are equivalent to those recited in claim 21.

For the foregoing reasons, Applicants respectfully assert that claims 13-15 and 17-22 are patentable over *Thompson* in view of *Djurovich* and respectfully request that these rejections be withdrawn.

2. WO 01/41512; Inorganic Chemistry, Vol. 30, 1991, 1685-1687; and WO 00/70655

Claims 12-22

Claims 12-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Thompson* in view of the Dedeian et al. article Inorganic Chemistry, Vol. 30, 1991, 1685-1687 ("*Dedeian*") and WO 00/70655 ("*Baldo*"). Applicants respectfully maintain their traverse this rejection.

Applicants' remarks pertaining to *Thompson* presented above are equally applicable here, and are reasserted without being rescripted in this space. *Thompson* teaches in the paragraph bridging pages 34 and 35, that in L_2MX complexes, the X ligand can, in some cases, affect the energy of emission and efficiency. There is no suggestion that the L ligands themselves, and/or substituents on the L ligands can be used to tune the color. There is no teaching at all of substituents on the R groups for the arylquinoline structure shown in Fig. 39. Applicants respectfully traverse the Examiner's finding that *Thompson* discloses claimed ligands insofar as *Thompson*, per the foregoing analysis, discloses the "arylquinoline" ligands as useful in L_2MX complexes and not in L_3M complexes and discloses distinct ligands in its own L_3M complexes (Figs. 3, 7) and yet further distinct ligands in LL'L"M complexes where each ligand is different (see Fig. 40).

Dedeian discloses several monosubstituted and unsubstituted phenylpyridine ligands (Table I) in an article devoted to the disclosure of a new synthetic route to the preparation of Ir(III) complexes with 2-phenylpyridines. *Dedeian* identifies *fac* tris-ortho-metalated Ir(III) complexes as strong photoreductants. There is no teaching or suggestion in *Dedeian* that any complex therein disclosed would be useful as a phosphorescing molecule. All of the *Dedeian* $Ir(ppy)_3$ species shown that have substituents are substituted in the 4-position except for one, methoxypyridine, which is 5-substituted. For this reason, Applicants respectfully traverse the statement that *Dedeian* shows that the substituents can be placed anywhere on the ligand. It is not clear from a reading and careful examination of *Dedeian* whether the substituents were placed where they were to demonstrate that such variations would not affect the desired *fac* product of the synthesis rather than having anything to do with phosphorescent properties. As noted earlier, the principle theme of this article is to describe a new synthetic pathway to $Ir(ppy)_3$ complexes useful as photoreductants.

Baldo is directed to L_3M complexes represented by the formula $Ir(ppy)_3$ where ppy is phenylpyridine. The ppy constituents may be substituted with alkyl or aryl or may be modified by adding a heteroatom or moving the heteroatom(s) of the aromatic structure to different positions. Therefore, even if *Thompson*, *Dedeian* and *Baldo* are

combinable for the reasons given by the Examiner, there is no teaching or suggestion to motivate changing *Thompson's* L_2MX, L_3M or LL'L"M ligands and their patterns of combination to Applicants' ligands and Applicants' patterns of combination. As noted in detail above, *Thompson* teaches an "arylquinoline" [phenylisoquinoline] ligand only in his L_2MX complex; both *Dedeian* and *Baldo* teach L_3M complexes comprised of $Ir(ppy)_3$. Nothing in any of these references suggests that phenylisoquinoline is useful as L in L_3M or that *Thompson's* L in L_2MX could also be transferred to *Thompson's* L_3M. To the contrary, *Thompson* teaches different ligands for each of L_2MX, L_3M and LL'L"M and *Dedeian* and *Baldo* teach only $Ir(ppy)_3$ for their L_3M complexes. So even if the references are combinable for the reasons given by the Examiner, the references, alone or in combination, do not render claims 12-22 obvious and therefore unpatentable.

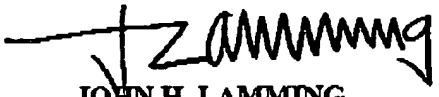
As to the discussion on weight percent of emissive material, Applicants reiterate that the references clearly teach that quantum efficiency as a function of concentration cannot be systematically determined, rather, it is an empirical property. *Djurovich's* discussion is tied to $Ir(ppy)_3$ complexes and *Thompson's* relates solely to BTIr dopant in CBP host (page 13, lines 9-16) which is an L_2MX compound wherein both L = phenylbenzothiazole and X = acac, two ligand species not present in any form of Applicants' claim 21 complexes.

Applicants respectfully request that these rejection be withdrawn.

Conclusion

In view of the foregoing remarks, Applicants respectfully submit that the above referenced pending application is in condition for allowance. A Notice of Allowance for Claims 12-22 is therefore earnestly solicited.

Respectfully submitted,



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